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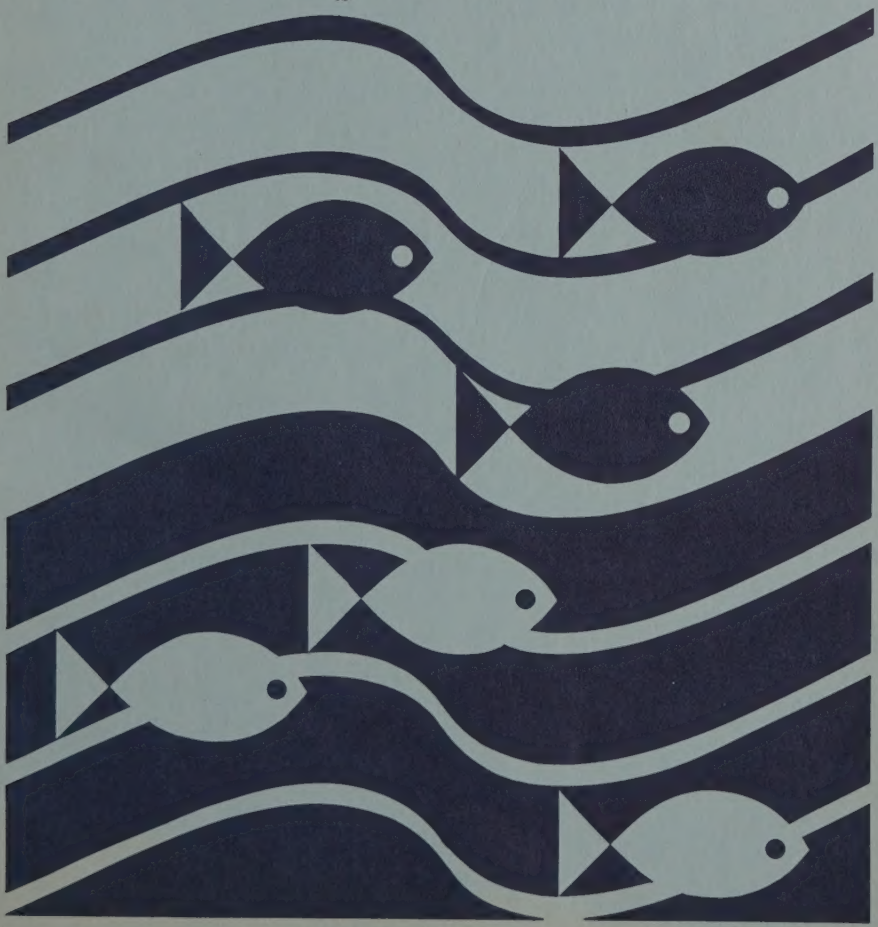

Fisheries Review

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Fisheries Review is intended to furnish fishery biologists with abstracts of current literature in sport fishery research and management.

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Fisheries Review

Vol. 31, No. 2, 1986

CONTENTS

AQUATIC PLANTS AND THEIR CONTROL..... 1

CULTURE AND PROPAGATION

General Fish Culture..... 1
Trout and Salmon Culture..... 1
Other Anadromous Species Culture..... 2
Warmwater Culture..... 2
Mariculture..... 4
Feeds, Feeding and Nutrition..... 4
Aquariums..... 6
Miscellaneous Culture Techniques and Equiptment 6

LIMNOLOGY AND OCEANOGRAPHY

General..... 7
Physical..... 7
Benthos..... 7
Plankton..... 8
Primary Production..... 8

MORPHOLOGY, PHYSIOLOGY, GENETICS AND BEHAVIOR

Morphology..... 8
Physiology..... 13
Genetics, Variation Studies, Hybridization..... 27
Behavior..... 30

NATURAL HISTORY

Life Histories - General Works..... 33
Population Studies - Production, Standing Crop, Recruitment. 36
Spawning Habits and Movements, Sex Ratios, Fecundity, etc... 39
Movements, Seasonal and Depth Distribution, etc..... 42
Foods and Feeding..... 42
Age and Growth..... 47
Geographical Distribution, Fish surveys, etc..... 49
Abundance, Factors of; Survival and Mortality..... 52
Identification, Keys, Classification..... 54

PARASITES AND DISEASES

General..... 57
Bacterial..... 58
Fungal..... 59
Protozoan..... 59
Viral..... 60
Other..... 60

POLLUTION AND TOXICOLOGY

Pollution..... 64
Fish Kills..... 66
Toxicology; Bioassays..... 66
Fish Toxicants..... 74

RESEARCH AND MANAGEMENT

General..... 74
Administration and Planning..... 75
Reports of Fishery Stations, States, etc..... 75
Habitat Alterations..... 75
Harvest, Creel Census, etc..... 76
Regulations..... 77
Fish Control and Removal..... 77
Marking and Tagging..... 77
Stocking and Introductions..... 78
Fishing Gear and Techniques..... 78
Fishways, Fish Passage through Dams, etc..... 79
Mathematical, Statistical Methods and Modeling..... 79
Lake Management and Research..... 80
River and Stream Management and Research..... 81
Large Impoundment Management and Research..... 81
Marine Management and Research..... 81
Utilization of Fishery Products..... 83
Miscellaneous Techniques and Equipment..... 83

AUTHOR INDEX (Salmon)..... 85
GEOGRAPHIC INDEX (Yellow)..... 105
SYSTEMATIC INDEX (Blue)..... 109

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[Dep. Fish. Oceans, P.O. Box 5667, St. John's, NF A1C 5X1, Canada] We tested the hypothesis that anadromous salmonids are guided on their homeward migration by population-specific pheromones. Our findings do not support the hypothesis. Wild migrant Arctic charr, *Salvelinus alpinus*, from Ikarut River, Labrador were transferred and held in a tributary previously uninhabited by anadromous fish. None of the charr migrating up Ikarut River entered the tributary after fish were transferred. Similarly, migrant charr, which were caught in Ikarut River and released in the tributary below the captive fish, did not remain in the tributary. We re-evaluated the data which have been used to uphold the concept of pheromone attraction in salmonid migration and concluded that support for the hypothesis is unsubstantiated.

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[Moss Landing Mar. Lab., P.O. Box 450, Moss Landing, CA 95039] Life history information on 28 sixgill sharks, collected off California, was obtained from May 1982 through Sept. 1984. Only one mature sixgill shark, a 421 cm TL female with term embryos, was examined. Size at maturity was estimated for females by comparing gonad development with length-weight measurements. Gut analysis revealed that the sixgill shark's diet consists mainly of bony and cartilaginous fishes. Since sixgill sharks do not appear to be abundant anywhere, their distribution and movement patterns along the deep coastal waters off California are, for the most part, unknown.

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The upstream periodic migration of juvenile gobies, *Sicydium plumieri* (Bloch, 1786), is related to the last quarter moon phase when the postlarvae appear along the sea shore as they approach the river mouth. They begin to metamorphose into juveniles as soon as they reach fresh water. They change from a transparent planktivorous marine fish to a juvenile specialized herbivore and shrink in length during metamorphosis. Juveniles migrate upstream in one long column that can take as much as two days to pass a single point along the river. Juveniles respond to flooding river pulses by rhythmic tail thrashing and climb over cataracts that are inaccesible to native snails and other fishes. When swimming by a tributary stream, certain juveniles indicate a homing instinct. Larger adults live in the head waters and presumably spawn among the rocks and boulders. Males in nuptial colors defend territories in summer in the fast flowing upland streams.

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[Chem. Hazard Eval. Prog., Oak Ridge Natl. Lab., Oak Ridge, TN 37831] The The trispot darter *Etheostoma trisella* Bailey and Richards occurs only in the Conasauga River and its tributaries in northern Georgia and southeastern Tennessee. It requires two separate but interconnected habitats. When not breeding, *E. trisella* occupies the peripheral zones of the main river in areas of slow current, gravel-silt substrate, and aquatic vegetative or leaf litter cover. In the study area, the breeding habitat is a small clay-bottomed seepage stream with heavy aquatic vegetation and relatively warm water temperatures located in a marshy pasture 2.5 km from the main river. The principal food items in both habitats are Ephemeroptera nymphs and Chironomidae larvae, which account for 19% and 70%, respectively, of the items eaten annually. A relative biomass index indicates more equal contributions from both groups. Parasitism is minimal and predation is not evident. Trispot darters spawn from January to March. Males exhibit bright orange-red and green breeding colors and have tubercles on the anal fin rays. Fecundity estimates range from 56-154 mature eggs per female and up to 292 per female when developing eggs are included. The eggs hatch in 30 days at 12 C and larval development is rapid, reaching the juvenile stage in 41 days. First-year individuals grow to an average size of 36 mm SL. The darters live 2+ years and adults have a 1:1 sex ratio. The uncommon habitat association required for successful reproduction indicates that *E. trisella* is vulnerable to human impact and its threatened species designation is justified.

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POPULATION STUDIES, PRODUCTION, RECRUITMENT, ETC.

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86-001683 CONTINUED in percent of body weight is higher among the dwarfed forms in high-mountain lakes than among better growing populations in lower-laying areas. This is an argument against the theory that dwarfed chars suffer starvation. In Mittlerer Plenderlesee, surface food predominates during the ice-free period; under the ice cover chars feed mainly on aquatic insect larvae. In Oberer Plenderlesee the (summer) food is similar. In Drachensee in summer more chironomid pupae than surface food are taken up, in winter mainly aquatic insect larvae. In the lakes studied in Salzkammergut, chars tend to feed in summer nearly entirely on crustacean-plankton and chironomid pupae; in winter they take more benthic food. In Hallstättersee, however, they seem to be forced out of the plankton zone by coregonids. Fish are only rarely found in the digestive tract.

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POLLUTION (CONTINUED)

86-001868 CONTINUED outlets. c) Sulfate is the dominant anion in precipitation and in the chemistry of these lakes. d) Mass balance calculations at calibrated watersheds (Lake Clara and Lake Vandercook) indicate that more than 90% of hydrogen ions come directly from precipitation. The upper midwest is sensitive to future increases in acid deposition. At the precipitation pH found in the Adirondack Mountains of New York (ph 4.1), about 30% of the lakes would be acidified based on model predictions. The model described here is based on a mass balance for alkalinity in a lake. It was calibrated with field measurements, and the kinetic formulations were based on laboratory experiments reported in the literature on chemical weathering. The model can be used in a steady-state or a time-variable mode to yield the response to scenarios of increasing or decreasing acid deposition. It is a tool that may be used to estimate the lake resources at risk at various levels of acidic deposition.

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[Dep. Zool., Miami Univ., Oxford, OH 45056] Stoneroller minnows, *Campostoma anomalum*, were exposed to four sublethal concentrations of phenol (6, 8, 10, and 12 ppm) for 48 hours, and the effects of these concentrations on temperature tolerance (CTMax) and low dissolved oxygen tolerance were observed. The mean CTMax values of fish exposed to 6 and 8 ppm

TOXICOLOGY; BIOASSAYS (CONTINUED)

86-001882 CONTINUED phenol (35.6 and 35.3 C, respectively) did not differ from the mean CTMax recorded for control fish (35.8 C). Although fish exposed to 8 ppm phenol exhibited loss of equilibrium at a lower mean dissolved oxygen concentration (1.5 mg $O_2 \cdot l^{-1}$) than the control group (1.9 mg $O_2 \cdot l^{-1}$), these values were not significantly different. Fish exposed to 6 ppm phenol had a significantly greater ($P<0.05$) mean oxygen tolerance (1.3 mg $O_2 \cdot l^{-1}$) than the control group. Exposure to 10 ppm phenol significantly depressed temperature tolerance (34.7C but did not affect low oxygen tolerance (1.9 mg $O_2 \cdot l^{01}$). The results of the present study suggest that stoneroller minnows may become more sensitive to increased temperature and decreased dissolved oxygen concentrations following exposure to sublethal concentrations.

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[Great Lakes Fish. Res. Br., Can. Cent. Inland Waters, Burlington, ON L7R 4A6, Canada] The biological half-lives of five dibenzo-p-dioxins and two dibenzofurans were determined in rainbow trout following a single oral exposure. Estimated half-lives ranged from 2 d for 2, 7-dichlorodibenzo-p-dioxin to 43 d for 1, 2, 3, 4-tetrachlorodibenzo-p-dioxin among the dioxins, and from 12 d for octachlorodibenzofuran to 24 d for 3, 6-dichlorodibenzofuran. No consistent relationship was shown between half-life and the degree of chlorination. Absorption efficiencies varied from 2 to greater than 30%, although most values ranged from 5 to 16%.

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In 1979 and 1980 the Fisheries Research Section conducted a 2-year study on Little Emerald Lake and Emerald Lake, collectively called Emerald Lakes. Emerald Lake, the third largest natural lake in Colorado, supports a self-sustaining hybrid rainbow-cutthroat trout population originating from the introduction of these two species in the late 1880's. Inlet and outlet spawning habitats, which sustain this trout population, were delineated. In 1980 the inlet stream contained 581 m^2 of reproductive habitat; the outlet stream contained 805 m^2 of spawning habitat and 695 m^2 of reproductive habitat. In 1980 there were 2,985 (±372) adults in the outlet spawning run and 2,357 (±239) adults in the inlet spawning run. Age and growth calculations were based on 962 scales collected from trout at the inlet and outlet weir sites and by gillnetting Emerald Lakes. Age groups III, IV, and V made up 93% of the outlet and 83% of the inlet spawning runs. The difference in summer water temperatures between inlet and outlet spawning counts, to distinguish between inlet- and outlet-origin spawning sites. As a result it was estimated that 62% of the adults sampled in the Emerald Lakes system had circuli counts that identified them as originating from outlet spawning sites. Creel survey data indicated an

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Adams, A. M.
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Illinois Natural History Survey
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International Council for the Exploration of the Sea
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Alabama: Tallapoosa River
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Alaska
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Alaska: Kodiak Archipelago
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Alaska: Pavlof Bay
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Atlantic Ocean
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Atlantic Ocean, North
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Atlantic Ocean, North: Georges Bank
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Atlantic Ocean, North: Irish Sea
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Atlantic Ocean, North: Rockall Trough
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Atlantic Ocean, South
86-001615
Atlantic Ocean: Atlantic Sahara
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Australia
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Australia: Finke River
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Australia: Fraser Island
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Australia: Great Barrier Reef
86-001622
86-001626
Australia: New South Wales: Molonglo River
86-001859
Australia: Northern Territory: Alligator Rivers System
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Australia: Queensland: Moreton Bay
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Austria
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Barents Sea
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Brazil
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Brazil: Rio Aripuana
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British Columbia
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California
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California: Dillon Beach
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California: Elkhorn Slough
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California: Humboldt Bay
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California: Sacramento-San Jaquin Estuary
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California: Sacramento-San Joaquin Estuary
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California: San Joaquin Valley
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Canada: Alberta
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Canada: Alberta: Cold Lake
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Canada: Alberta: Edmonton
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Canada: Alberta: Gull Lake
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Canada: Alberta: Lesser Slave Lake
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Canada: Alberta: Prairie Creek
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Canada: British Columbia
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Canada: British Columbia: Vancouver Island
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Canada: Labrador
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Canada: Manitoba
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Canada: New Brunswick: Passamoquoddy Bay
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Canada: Newfoundland: Gander River
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Canada: Nova Scotia
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Canada: Ontario
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Canada: Ontario: Dickson Lake
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Canada: Ontario: Experimental Lakes Area
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Canada: Ontario: Mud Lake
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Canada: Ontario: Ottawa
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Canada: Quebec
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Canada: Quebec: St. Lawrence River
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Canada: Saskatchewan: Prince Albert Natl. Park: Crean Lake
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Caspian Sea
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Chesapeake Bay
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Chile
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China
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China: Yunnan
86-001784

...CONTINUED...
China: Yunnan
86-001788
Colorado: Hinsdale Cty.: Emerald Lakes
86-001992
Columbia River
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Czechoslovakia: Musov Reservoir
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England
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England: Northamptonshire: River Nene
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Europe
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Finland
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Finland: Lake Saimaa
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Florida
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France
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France: Bay of Biscay
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France: Elorn River
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Georgia: Conasauga River
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Great Lakes
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Greenland
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Gulf of Mexico
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Gulf of Mexico: Flower Garden Banks
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Gulf of St. Lawrence
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Honduras, Central
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Hungary: Lake Balaton
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Idaho
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Idaho: Clearwater River
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Idaho: Henry's Fork
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Illinois
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Indian Ocean
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Irish Sea
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Israel
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Israel: Lake Kinneret
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Israel: River Jordan
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Japan
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Japan: Chicugo Estuary
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Japan: Miyake-jima
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Japan: Sagami Bay
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Japan: Suo-nada
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Japan: Tama River
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Kentucky: Clarks River
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Kentucky: Rolling Fork
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Kuwait
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Lake Erie: Long Point Bay
86-001748
Lake Huron
86-001737
Lake Michigan
86-001737
86-001957
Louisiana
86-001625
Maine
86-001750
Maine: Gulf of Maine
86-001945
Maine: Penobscot River
86-001657
Malawi: Lake Malawi
86-001678
Malaysia
86-001840
Malaysia: Pulau Penang
86-001796
Marshall Islands: Enewetak Atoll
86-001632
Maryland
86-001856
86-001857
Mediterranean Sea
86-001832
86-001858
Mediterranian Sea
86-001716
Mexico
86-001764
86-001775
Mexico: Sonora: Rancho la Brisca
86-001785
Michigan: Crawford Cty.: Au Sable River
86-001797
Mississippi
86-001303
Mississippi: Buffalo River
86-001717
Mississippi: Homochitto River
86-001717
Mississippi: Little Tallahatchie River
86-001598
Montana
86-001947
Nebraska
86-001552
Nevada: White River
86-001934
New Hampshire
86-001943

New York
86-001963
86-001964
New Zealand
86-001372
86-001778
New Zealand: Canterbury: Lake Ellesmere
86-001685
New Zealand: Pauatahanui Inlet
86-001725
New Zealand: Porirua Inlet
86-001725
New Zealand: Waitaki River
86-001655
North America
86-001356
86-001357
86-001765
86-001766
86-001999
North Carolina
86-001710
North Carolina: Chowan River
86-001582
Northern Ireland
86-001944
86-001959
Norway: Lake Selura
86-001692
Norway: River Nidelva
86-001949
Norway: Vangsvatnet Lake
86-001673
Ohio
86-001735
86-001975
Ohio River
86-001842
Oklahoma
86-001591
86-001603
Oregon
86-001662
86-001715
86-001736
Pacific Ocean
86-001341
86-001344
86-001348
86-001372
86-001583
86-001597
86-001602
86-001605
86-001612
86-001616
86-001618
86-001620
86-001653
86-001658
86-001660
86-001662
86-001674
86-001687
86-001691
86-001695
86-001703
86-001715
86-001736
86-001768
86-001776
86-001828
86-001974
86-002000
86-002001

...CONTINUED...

Pacific Ocean
86-002003
86-002007
86-002008
86-002009
86-002010
86-002012
Pacific Ocean: Great Barrier Reef
86-001622
86-001626
Pacific Ocean: Strait of Georgia
86-002006
Papua New Guinea
86-001713
Papua New Guinea: Sepik River
86-001994
Paraguay
86-001787
Peru
86-001695
Puerto Rico
86-001584
Puget Sound
86-002010
River Jordan
86-001995
Sargasso Sea
86-001743
Singapore
86-001293
South Africa
86-001684
86-001758
86-001774
South Africa: Kei River Estuary
86-001733
South Africa: Transvaal
86-001823
South America
86-001742
Sri Lanka
86-001315
86-001587
Switzerland: Lake Constance
86-001541
Taiwan
86-001302
Tennessee: Conasauga River
86-001671
United States
86-001281
86-001868
86-001938
86-002012
USSR
86-001291
86-001871
USSR: Don River
86-001752
USSR: Kuban River
86-001946
USSR: Sea of Azov
86-001747
86-001970
USSR: Southern Primorye
86-001585
USSR: Ural River
86-001760
USSR: Volga River
86-001757
86-001759
86-001968
Venezuela
86-001624
86-001675

Venezuela: Rio Chama River
86-001730
Wales
86-001659
86-001935
Washington
86-001662
Washington: Columbia River
86-001998
West Germany
86-001666
West Virginia: Ohio River
86-001842
Wisconsin
86-001629
86-001754
86-001761
86-001821
Wisconsin: Dane Cty.: Marsh Creek
86-001633
Wisconsin: Iowa Cty.: Halverson Lake
86-001278
Wisconsin: Lake Wingra
86-001751
Wisconsin: Manitowoc River
86-001721
Wisconsin: Sheboygan River
86-001721
Wisconsin: Twin River
86-001721

Abramis brama
Liver
86-001871
Management/Research--Marine
86-001970
Predator/Prey Relationships
86-001690
Stocking/Introductions
86-001970
Supplemental Stocking
86-001970
Thermal Pollution
86-001871
Trophic Relationships
86-001690
Acanthopagrus
Parasites/Diseases
86-001828
Trematodes
86-001828
Acestrorhynchinae
Karyotypes
86-001529
Acipenser baeri
Culture/Propagation
86-001316
Diets
86-001316
Feeding Experiments
86-001316
Acipenser fulvescens
Lamprey Parasitism
86-001853
Parasites/Diseases
86-001853
Acipenser gueldenstaedti
Abundance/Factors of
86-001752
Biochemical Composition
86-001288
Culture/Propagation
86-001288
86-001289
86-001311
Endocrinology
86-001400
Feeding Experiments
86-001311
Feeds
86-001311
Flow Regimes
86-001752
Hormones
86-001400
Inbreeding
86-001289
Metabolic Rates
86-001395
Pond Culture
86-001288
Respiration
86-001395
Spawning
86-001752
Acipenser stellatus
Brood Stock
86-001290
Culture/Propagation
86-001290
Endocrinology
86-001400
Hormones
86-001400
Acipenser transmontanus
Digestive System
86-001408

...CONTINUED...
Acipenser transmontanus
Enzymes
86-001408
Acipenseridae
Abundance/Factors of
86-001759
86-001760
Floods
86-001759
Flow Regimes
86-001630
86-001759
Management/Research--Rivers and Streams
86-001968
Predator/Prey Relationships
86-001760
Salinity
86-001630
Spawning
86-001630
Stocking/Introductions
86-001968
Supplemental Stocking
86-001968
Adinia xenica
Early Development
86-001358
86-001359
Alosa aestivalis
Foods/Feeding
86-001582
Nets/Netting
86-001971
Sampling
86-001971
Spawning
86-001582
Alosa fallax fallax
Parasites/Diseases
86-001790
Alosa pseudoharengus
Acid Precipitation
86-001459
Age/Growth
86-001699
Blood Chemistry
86-001459
Nets/Netting
86-001971
pH
86-001459
Sampling
86-001971
Alosa sapidissima
Culture/Propagation
86-001307
Tank Culture
86-001307
Ambassis agrammus
Early Development
86-001389
Spawning
86-001389
Ammodytes hexapterus
Abundance/Factors of
86-001749
Predator/Prey Relationships
86-001749
Ammodytes personatus
Hatching Time
86-001601
Life History/General
86-001601
Amphiprion
Symbiosis
86-001554

Amphiprion clarkii
Age/Growth
86-001702
Protandry
86-001702
Anguilla
Distribution/Geographical
86-001714
86-001716
86-001727
Fish Stocks
86-001714
Life History/General
86-001714
Meristic Studies
86-001714
Variation Studies
86-001714
Anguilla anguilla
Age/Growth
86-001708
Biochemical Composition
86-001404
Culture/Propagation
86-001306
Currents
86-001726
Distribution/Factors of
86-001726
Induced Maturation
86-001422
Lipid Composition
86-001404
Metamorphosis
86-001708
Polychlorinated Biphenyls
86-001862
Population Studies
86-001611
Starvation
86-001404
Anguilla australis
Foods/Feeding
86-001685
Anguilla japonica
Culture/Propagation
86-001302
Digestive System
86-001507
Enzymes
86-001507
Mucus
86-001506
Pond Culture
86-001302
Anguilla rostrata
Anesthetics
86-001887
Distribution/Geographical
86-001581
86-001743
Food Conversion Efficiency
86-001419
Life History/General
86-001581
Maturation
86-001581
Metabolic Rates
86-001419
Metamorphosis
86-001427
Movements
86-001657
MS-222
86-001887

...CONTINUED...
Anguilla rostrata
Temperature
86-001419
Anoplopoma fimbria
Nematodes
86-001837
Parasites/Diseases
86-001837
Apeltes quadracus
Spawning
86-001634
Aphanius dispar
Hybridization
86-001551
Aphanius fasciatus
Hybridization
86-001551
Aplodinotus grunniens
Acanthocephala
86-001842
Parasites/Diseases
86-001842
Pomphorhynchus rocci
86-001842
Archoplites interruptus
Parasites/Diseases
86-001793
Archosargus probatocephalus
Copper
86-001921
Heavy Metals
86-001921
Archosargus unimaculatus
Age/Growth
86-001707
Condition Factors
86-001707
Length-Weight Relationships
86-001707
Argyropelecus hemigymnus
Bioluminescence
86-001470
Arius felis
Copper
86-001921
Heavy Metals
86-001921
Arnoglossus thori
Age/Growth
86-001706
Metabolic Rates
86-001706
Barbus
Evolution
86-001762
86-001763
Morphology
86-001762
86-001763
Taxonomy
86-001762
86-001763
Barbus marequensis
Dolops ranarum
86-001823
Parasites/Diseases
86-001823
Parasitic Copepods
86-001823
Basilichthys bonariensis
Condition Factors
86-001705
Bathylagidae
Foods/Feeding
86-001669

Bathyraja andriashevi
New Species
86-001768
Bathyraja bergi
New Species
86-001768
Bathyraja fedorovi
New Species
86-001768
Bathyraja isotrachys
New Species
86-001768
Taxonomy
86-001768
Benthophilus
Fecundity
86-001648
Maturation
86-001648
Spawning
86-001648
Blennius pavo
Liver
86-001493
Brachydanio
Embryology
86-001423
Brachydanio rerio
Cadmium
86-001453
Embryology
86-001374
Gene Organization
86-001548
Heavy Metals
86-001453
Brevoortia tyrannus
Fungal Diseases
86-001810
Parasites/Diseases
86-001810
Brosme brosme
Distribution/Geographical
86-001589
Distribution/Vertical
86-001589
Movements
86-001589
Spawning
86-001589
Buglossidium luteum
Age/Growth
86-001706
Metabolic Rates
86-001706
Caesio teres
Spawning
86-001632
Campostoma anomalum
Oxygen
86-001882
Phenols
86-001882
Temperature
86-001882
Canthigaster punctatissima
Social Behavior
86-001565
Spawning
86-001565
Caranx caballus
Identification/Larvae
86-001393
Morphology
86-001393
Caranx sexfasciatus
Identification/Larvae
86-001393
Morphology
86-001393
Carassius
Hybridization
86-001532
Carassius auratus gibelio
Liver
86-001871
Carassius auratus
Bacterial Diseases
86-001413
Bacterial Flora
86-001413
Chlorinated Byphenyls
86-001865
Culture/Propagation
86-001305
Dibenzo-p-Dioxins
86-001865
Digestive System
86-001370
Endocrinology
86-001435
Growth Hormone
86-001471
Hormones
86-001929
Induced Maturation
86-001305
Nervous System
86-001435
86-001519
Parasites/Diseases
86-001413
pH
86-001929
Pineal Body
86-001474
Reproductive System
86-001424
Thermal Pollution
86-001871
Vision
86-001442
86-001522
Carassius auratus langsdorfii
Polyploidy
86-001540
Triploid Fish
86-001540
Carassius carassius
Anoxia
86-001447
Karyotypes
86-001550
Management/Research - Ponds
86-001613
Population Studies
86-001613
Catoprion mento
Aquariums
86-001323
Culture/Propagation
86-001323
Catostomus commerson
Food Conversion Efficiency
86-001405
Catostomus commersoni
Acid Precipitation
86-001459
Age/Growth
86-001405

...CONTINUED...
Catostomus commersoni
Blood Chemistry
86-001459
86-001516
Calcium
86-001516
DNA
86-001401
Foods/Feeding/Selectivity
86-001405
pH
86-001459
86-001479
86-001516
Cetengraulis edentulus
Commercial Fishing
86-002002
Harvest
86-002002
Management/Research--Marine
86-002002
Cetonurus
Taxonomy
86-001782
Channa argus
Lipid Composition
86-001410
Channa punctatus
Salinity
86-001421
Chloroscombrus orqueta
Identification/Larvae
86-001393
Morphology
86-001393
Chondrichthyes
Variation Studies
86-001546
Chondrostoma polylepis
Distribution/Geographical
86-001767
Taxonomy
86-001767
Chondrostoma polylepis duriensis
New Subspecies
86-001767
Chondrostoma willkommi
Distribution/Geographical
86-001767
Taxonomy
86-001767
Chromis dispilus
Early Development
86-001372
Eggs
86-001372
Life History/General
86-001372
Spawning
86-001372
Chrysophrys major
Blood Sampling
86-001448
Cichlasoma panamense
Spawning
86-001649
Cichlasoma tetracanthum
Embryology
86-001647
Spawning
86-001647
Cichlidae
Dentition
86-001385
Foods/Feeding
86-001678

...CONTINUED...
Cichlidae
Histology
86-001375
Rodlet Cells
86-001375
Schooling Behavior
86-001678
Clarias batachus
Calcium
86-001505
Corpuscle of Stannius
86-001505
Ultimobranchial Gland
86-001505
Clarias gariepinus
Culture/Propagation
86-001317
Dolops ranarum
86-001823
Feeding Experiments
86-001317
Food Digestibiltity
86-001317
Hormones
86-001418
Parasites/Diseases
86-001823
Parasitic Copepods
86-001823
Reproduction
86-001418
Clupea harengus
Biological Tags
86-001967
Marking/Tagging
86-001967
Parasites/Diseases
86-001967
Clupea harengus pallasi
Biomass
86-001620
Intestinal Lesions
86-001833
Parasites/Diseases
86-001833
Population Studies
86-001620
Spawning
86-001620
Clupeidae
Paleontology
86-001772
Taxonomy
86-001772
Coelorhynchus fasciatus
Foods/Feeding
86-001676
Conger oceanicus
Habitat Selection
86-001566
Coregonidae
Hybridization
86-001541
Metabolic Rates
86-001414
Coregonus
Bioenergetics
86-001415
Heavy Metals
86-001904
Lead
86-001904
Mortality Factors
86-001769
Coregonus artedii
Commercial Fishing
86-001993

...CONTINUED...
Coregonus artedii
Management/Research--Lakes
86-001993
Population Studies
86-001993
Coregonus clupeaformis
Chemoreception
86-001563
Corydoras
Body Form
86-001391
Variation Studies
86-001391
Corydoras adolfoi
Aquariums
86-001327
Culture/Propagation
86-001327
Cottidae
Body Form
86-001392
Cottus bairdi
Acoustico-Lateralis System
86-001445
Hybridization
86-001547
Parasites/Diseases
86-001797
Cottus cognatus
Hybridization
86-001547
Cottus gobio
Spawning
86-001643
Crenichthys baileyi grandis
Management/Research--General
86-001934
Stocking/Introductions
86-001934
Ctenopharyngodon idella
Blood Chemistry
86-001439
Culture/Propagation
86-001318
Feeds
86-001318
Ctenurella
Mouth Parts
86-001770
Paleontology
86-001770
Cyclopteridae
Distribution/Geographical
86-001628
Spawning
86-001628
Cynoptaminae
Karyotypes
86-001529
Cynoscion nebulosus
Management/Research--Marine
86-001607
Population Studies
86-001607
Cyprinidae
Skeletal System
86-001356
86-001357
Taxonomy
86-001356
86-001357
86-001765
86-001766
Cyprinodon pachycephalus
New Species
86-001775
Cyprinodon variegatus
Foods/Feeding
86-001664
Mutagens
86-001525
Trophic Relationships
86-001664
Cyprinus
Hybridization
86-001532
Cyprinus carpio
Age/Growth
86-001698
Ammonia
86-001891
Blood Chemistry
86-001454
Cardio-Vascular System
86-001511
Culture/Propagation
86-001292
Digestion Rates
86-001665
DNA
86-001401
Embryology
86-001381
Enzymes
86-001452
Epidermal Lesions
86-001845
Foods/Feeding
86-001665
Induced Maturation
86-001292
Karyotypes
86-001544
Musculature
86-001452
Parasites/Diseases
86-001836
86-001845
Protein Synthesis
86-001465
Temperature
86-001452
86-001465
86-001698
Trematodes
86-001836
Cyprinus carpio chilia
Karyotypes
86-001544
Cyprinus longipectralis
Karyotypes
86-001544
Dicentrarchus labrax
Carnitine
86-001309
Culture/Propagation
86-001309
Endocrinology
86-001355
Enzymes
86-001420
Growth Depressents
86-001309
Growth Stimulants
86-001309
Diodontidae
Aquariums
86-001330
Culture/Propagation
86-001330
Diplocraterion
Paleontology
86-001774

Dorosoma cepedianum
Acanthocephala
86-001838
Foods/Feeding
86-001681
Impingement/Entrainment
86-001975
Parasites/Diseases
86-001838
Power Plants
86-001975
Screens
86-001975
Tanaorhamphus longirostris
86-001838
Dorosoma petenense
Acanthocephala
86-001838
Parasites/Diseases
86-001838
Tanaorhamphus longirostris
86-001838
Dorsoma cepedianum
Fish Passage
86-001975
Eigenmannia
Electrophysiology
86-001458
Electrophorus electricus
Electric Organs
86-001486
Elops saurus
Foods/Feeding
86-001664
Trophic Relationships
86-001664
Engraulidae
Population Studies
86-001535
Variation Studies
86-001535
Engraulis mordax
Age/Growth
86-001703
Biomass
86-001612
Egg Drift
86-001623
Egg Survival
86-001623
Erimyzon sucetta
Caryophyllaeidae
86-001821
Cestodes
86-001821
Isoglaridacris multivitellaria
86-001821
Parasites/Diseases
86-001821
Esox lucius
Cestodes
86-001852
Exercise
86-001501
Parasites/Diseases
86-001852
Stress
86-001501
Triaenophorus crassus
86-001852
Esox masquinongy
Life History/General
86-001588
Management/Research--General
86-001588
Etheostoma blennioides
Temperature
86-001444
Etheostoma caeruleum
Temperature
86-001444
Etheostoma flabellare
Early Development
86-001380
Egg Size
86-001380
Spawning
86-001633
Temperature
86-001444
Etheostoma nigrum
Early Development
86-001380
Egg Size
86-001380
Spawning
86-001633
Etheostoma spectabile
Egg Size
86-001472
Fecundity
86-001472
Etheostoma trisella
Life History/General
86-001595
Etheostoma ulocentra
Life History/General
86-001598
Taxonomy
86-001598
Etroplus maculatus
Life History/General
86-001587
Eutropus
Distribution/Geographical
86-001773
Fish Lists/Keys
86-001773
Taxonomy
86-001773
Evermannichthys
Meristic Studies
86-001366
Variation Studies
86-001366
Fundulus
Nematodes
86-001844
Parasites/Diseases
86-001844
Fundulus heteroclitus
Digestive System
86-001478
Excretory System
86-001502
Osmoregulation
86-001502
Fundulus kansae
Gill Parasites
86-001789
Parasites/Diseases
86-001789
Parasitic Copepods
86-001789
Trematodes
86-001789
Gadus macrocephalus
Foods/Feeding
86-001658
Gadus morhua
Hexachlorobenzene
86-001907

...CONTINUED...

Gadus morhua
Naphthalene
86-001922
Oil
86-001922
Galaxias
Chlorothalonil
86-001892
Gambusia affinis
Age/Growth
86-001696
Cestodes
86-001848
Foods/Feeding
86-001664
Lacistorhynchus tenuis
86-001848
Maturation
86-001696
Mosquito Control
86-001951
Parasites/Diseases
86-001848
Spawning
86-001651
Trophic Relationships
86-001664
Gambusia heterochir
Masculinization
86-001521
Gasterosteus aculeatus
Behavior
86-001580
Distribution/Geographical
86-001737
Fright Reaction
86-001555
Gasterosteus wheatlandi
Fright Reaction
86-001555
Geotria australis
Blood Chemistry
86-001504
Gila atraria
Gyrodactylus
86-001843
Parasites/Diseases
86-001843
Trematodes
86-001843
Gila bicolor mohanensis
Salinity
86-001473
Temperature
86-001473
Gila bicolor mohavensis
Bioenergetics
86-001473
Gila elegans
Culture/Propagation
86-001295
Induced Maturation
86-001295
Girella punctata
Iron
86-001508
Girella tricuspidata
Cardio-Vascular System
86-001480
Gnathonemus petersi
Nervous System
86-001475
86-001476
Gnathonemus petersii
Electrophysiology
86-001457
Gobius niger
Life History/General
86-001600
Gymnoscopelus nicholsi
Mortality Rates
86-001615
Population Studies
86-001615
Gymnotus carapo
Electric Organs
86-001438
Electrophysiology
86-001438
Spawning
86-001631
Haptenchelys texis
Distribution/Vertical
86-001590
Fish Lists/Keys
86-001590
Identification
86-001590
Life History/General
86-001590
Helicolenus dactylopterus
Foods/Feeding
86-001676
Hemitripterus americanus
Cardio-Vascular System
86-001437
Temperature
86-001437
Heteropneustes fossilis
BHC
86-001930
Insecticides
86-001930
Malathion
86-001930
Organochlorides
86-001930
Organophosphates
86-001930
Hexanchus griseus
Life History/General
86-001583
Hiodon alosoides
Reproduction
86-001487
Huso huso
Abundance/Factors of
86-001757
Flow Regimes
86-001757
Spawning
86-001757
Hypleurochilus geminatus
Mouth Parts
86-001377
Hypophthalmichthys molitrix
Endocrinology
86-001409
Fish as Food
86-002013
Reproduction
86-001409
Reproductive System
86-001429
Hypopomus artedi
Electric Organs
86-001438
Electrophysiology
86-001438
Hypopomus occidentalis
Electric Organs
86-001438

...CONTINUED...
Hypopomus occidentalis
Electrophysiology
86-001438
Hypostomus dlouhyi
New Species
86-001787
Hypsoblennius hentzi
Mouth Parts
86-001377
Hypsoblennius ionthas
Mouth Parts
86-001377
Ichthyomyzon unicuspis
Lamprey Parasitism
86-001853
Parasites/Diseases
86-001853
Ictalurus nebulosus
Age/Growth
86-001697
Chemoreception
86-001578
Temperature
86-001697
Ictalurus punctatus
Aeromonas hydrophila
86-001808
Bacterial Diseases
86-001807
86-001808
Culture/Propagation
86-001303
86-001526
Edwardsiella ictaluri
86-001807
Enteric Septicemia of Catfish
86-001807
Fluridone
86-001902
Parasites/Diseases
86-001791
86-001807
86-001808
Phosphate Esters
86-001884
Polyploidy
86-001526
Triploid Fish
86-001526
Vision
86-001387
Ilyophis arx
Distribution/Vertical
86-001590
Fish Lists/Keys
86-001590
Identification
86-001590
Life History/General
86-001590
Ilyophis brunneus
Distribution/Vertical
86-001590
Fish Lists/Keys
86-001590
Identification
86-001590
Life History/General
86-001590
Jordanella floridae
Chlorinated Hydrocarbons
86-001905
Insecticides
86-001905
Methoxychlor
86-001905
Katsuwonus pelamis
Exercise
86-001515
Foods/Feeding
86-001660
Gills
86-001390
Respiration
86-001390
Labeo capensis
Blood Chemistry
86-001512
Respiration
86-001512
Labeo rohita
Bacterial Diseases
86-001804
Columnaris Disease
86-001804
Parasites/Diseases
86-001804
Stress
86-001804
Labeo umbratus
Blood Chemistry
86-001927
Toxicology
86-001927
Labio capensis
Early Development
86-001354
Labridae
Mouth Parts
86-001376
Lampetra appendix
Distribution/Geographical
86-001735
Lampetra japonica
Digestive System
86-001367
Lampetra tridentata
Body Temperature
86-001463
Temperature
86-001463
Lasiancistrus scolymus
New Species
86-001777
Lateolabrax japonicus
Movements
86-001656
Latimeria chalumnae
Life History/General
86-001599
Leiopotherapon unicolor
Parasites/Diseases
86-001830
Retrobulla angelae
86-001830
Trematodes
86-001830
Leiostomus xanthurus
Age/Growth
86-001710
Foods/Feeding
86-001670
Movements
86-001710
Lepidosiren paradoxa
Mouth Parts
86-001352
Lepomis cyanellus
Asbestos
86-001877
Lepomis macrochirus
Abundance/Factors of
86-001751

...CONTINUED...
Lepomis macrochirus
Age/Growth
86-001694
Bioenergetics
86-001694
Blood Chemistry
86-001516
Cadmium
86-001874
86-001928
Calcium
86-001516
Condition Factors
86-001694
Copper
86-001874
Culture/Propagation
86-001336
Enzymes
86-001461
Heavy Metals
86-001874
86-001895
86-001928
Irrigation Projects
86-001596
Life History/General
86-001596
Mercury
86-001895
Methyl Mercuric Chloride
86-001906
Nickel
86-001874
pH
86-001516
Phosphate Esters
86-001884
Piscicides
86-001336
Population Studies
86-001751
Stress
86-001446
TFM
86-001336
Thermal Shock
86-001461
Zinc
86-001874
Leptobrotula
New Genus
86-001776
Leptobrotula breviventralis
New Species
86-001776
Leuciscus idus melanotus
Phenols
86-001924
Limanda herzensteini
Fecundity
86-001637
Liza richardsoni
Foods/Feeding
86-001684
Lophius piscatorius
Foods/Feeding
86-001661
Lophius upsicephalus
Foods/Feeding
86-001676
Lota lota
Digestive System
86-001373
Lycodes
Ichthyofilaria canadensis
86-001822

...CONTINUED...
Lycodes
Nematodes
86-001822
Makaira nigricans
ATP
86-001397
Musculature
86-001397
Melanotaenica trifasciata
Aquariums
86-001332
Culture/Propagation
86-001332
Meluccius productus
Management/Research--Marine
86-002001
Menidia beryllina
Salinity
86-001644
Spawning
86-001644
Menidia peninsulae
Salinity
86-001644
Spawning
86-001644
Merluccius productus
Economic Values
86-002000
Life History/General
86-001597
86-002006
Management/Research--Marine
86-002000
86-002003
86-002006
86-002007
86-002010
Nets/Netting
86-001974
Parasites/Diseases
86-001794
Population Studies
86-001602
86-001605
86-001618
Recruitment
86-001602
Trophic Relationships
86-001674
Mesogobius batrachocephalus
Culture/Propagation
86-001300
Early Development
86-001300
Embryology
86-001300
Micropogonias undulatus
Foods/Feeding
86-001670
Micropterus dolomieui
Hatching Success
86-001748
Temperature
86-001748
Wind
86-001748
Micropterus notius
Foods/Feeding
86-001686
Habitat Selection
86-001686
Micropterus salmoides
Electrophoresis
86-001542

...CONTINUED...
Micropterus salmoides
Foods/Feeding
86-001686
Habitat Selection
86-001686
Micropterus salmoides floridanus
Early Development
86-001384
Hybridization
86-001384
Micropterus salmoides salmoides
Early Development
86-001384
Hybridization
86-001384
Momonatira
New Genus
86-001778
Momonatira globosus
New Species
86-001778
Morone americana
Foods/Feeding
86-001663
Hybridization
86-001549
Morone chrysops
Foods/Feeding
86-001663
Hybridization
86-001549
Morone saxatilis
Age/Growth
86-001520
Creel Census
86-001962
Culture/Propagation
86-001294
DNA
86-001520
Fertilization/Soil and Water
86-001294
Foods/Feeding
86-001294
Harvest
86-001962
Mutagens
86-001525
Pond Culture
86-001294
RNA
86-001520
Starvation
86-001520
Mugil capito
Culture/Propagation
86-001312.
Diets
86-001312
Feeding Experiments
86-001312
Feeds
86-001312
Nutrition
86-001312
Mugil cephalus
Foods/Feeding
86-001664
Trophic Relationships
86-001664
Mugil curema
Foods/Feeding
86-001664
Trophic Relationships
86-001664
Myctophidae
Spawning
86-001645
Myoxocephalus scorpius
Excretory System
86-001462
Osmoregulation
86-001462
Neogobius melanostomus
Coprophagy
86-001567
Nessorhamphus ingolfianus
Distribution/Vertical
86-001590
Fish Lists/Keys
86-001590
Identification
86-001590
Life History/General
86-001590
Nettastoma melanurum
Distribution/Vertical
86-001590
Fish Lists/Keys
86-001590
Identification
86-001590
Life History/General
86-001590
Noemacheilus barbatulus
Foods/Feeding
86-001689
Nortopis cornutus
Schooling Behavior
86-001530
Nothobranchius rachowi
Bioassay Techniques
86-001926
Sister-Chromatid Exchange Assay
86-001926
Notropis calientis
Fish Lists/Keys
86-001764
Taxonomy
86-001764
Notropis cornutus
Electrophoresis
86-001530
Notropis spilopterus
Taxonomy
86-001783
Variation Studies
86-001783
Ogcocephalidae
Aquariums
86-001325
Culture/Propagation
86-001325
Oligocottus snyderi
Life History/General
86-001586
Oncorhynchus
Dams
86-001947
Forecasting
86-001610
86-002008
Harvest
86-002009
Leeches
86-001825
Management/Research--Marine
86-002009
Parasites/Diseases
86-001825

...CONTINUED...
Oncorhynchus
Piscicola salmositica
86-001825
Population Studies
86-001610
86-002008
Oncorhynchus keta
Enzymes
86-001483
86-001484
Life History/General
86-001585
Lipid Metabolism
86-001398
Reproduction
86-001484
Spawning Migration
86-001398
Temperature
86-001351
Variation Studies
86-001351
Oncorhynchus kisutch
Asbestos
86-001877
Chemoreception
86-001570
Competition
86-001556
Egg Survival
86-001755
Fecundity
86-001755
Fish Stocks
86-001394
Foods/Feeding
86-001662
86-001682
Orientation/Homing
86-001570
Osmoregulation
86-001523
86-001916
Parr-Smolt Transformation
86-001523
pH
86-001916
Pheromones
86-001570
Polymorphism
86-001394
Predator/Prey Relationships
86-001691
Social Behavior
86-001569
Swimming Performance
86-001576
Oncorhynchus nerka
Life History/General
86-001937
Management/Research--General
86-001937
Spawning Migration
86-001650
Oncorhynchus tshawytscha
Ceratomyxa shasta
86-001811
Flow Regimes
86-001655
Foods/Feeding
86-001662
Movements
86-001655
Nematodes
86-001837

...CONTINUED...
Oncorhynchus tshawytscha
Osmoregulation
86-001523
Parasites/Diseases
86-001811
86-001837
Parr-Smolt Transformation
86-001523
Protozoan Diseases
86-001811
Opsanus beta
Chlorpyrifos
86-001903
Insecticides
86-001903
Opsanus tau
Acoustico-Lateralis System
86-001368
Mutagens
86-001539
Nervous System
86-001368
Oreochromis
DNA
86-001537
Karyotypes
86-001537
Oreochromis aureus
Enzymes
86-001396
Hermaphroditism
86-001412
Reproduction
86-001412
Oreochromis mossambicus
ATP
86-001433
Calcium
86-001431
86-001432
Dolops ranarum
86-001823
Endocrinology
86-001432
Foods/Feeding
86-001315
Nutrition
86-001315
Osmoregulation
86-001433
Parasites/Diseases
86-001823
Parasitic Copepods
86-001823
Oreoleuciscus
Taxonomy
86-001786
Oryzias latipes
Biomagnification
86-001860
Hyxachlorobenzene
86-001860
Melanophores
86-001371
Osmerus mordax
Harvest
86-001957
Ostraciidae
Aquariums
86-001330
Culture/Propagation
86-001330
Padogobius martensi
Sound Production
86-001577

Pagrus major
Gall Bladder
86-001498
Parablennius marmoreus
Mouth Parts
86-001377
Paralabrax humeralis
Hatschekia affluens
86-001847
Hatschekia amphiprocessa
86-001847
Parasites/Diseases
86-001847
Parasitic Copepods
86-001847
Paralichthys olivaceus
Cryptocaryon irritans
86-001813
Parasites/Diseases
86-001813
Protozoan Diseases
86-001813
White Spot Disease
86-001813
Parasilurus asotus
Cestodes
86-001831
Gangesia parasiluri
86-001831
Parasites/Diseases
86-001831
Parophrys vetulus
Cadmium
86-001917
Heavy Metals
86-001917
Oil
86-001917
Polychlorinated Biphenyls
86-001917
Parosphromenus filamentosus
Aquariums
86-001331
Culture/Propagation
86-001331
Perca flavescens
Abundance/Factors of
86-001761
Culture/Propagation
86-001337
Management/Research--Lakes
86-001761
Population Studies
86-001761
Pulp Mill Effluents
86-001914
Sex Determination
86-001337
Steroids
86-001469
Perca fluviatilis
Age/Growth
86-001704
Copper
86-001885
86-001886
Heavy Metals
86-001885
86-001886
Percidae
Life History/General
86-001591
Pericidae
Spawning
86-001646
Periophthalmus koelreuteri
Head Kidney
86-001386
Peteromyzon marinus
Electrophoresis
86-001531
Petromyzon marinus
Embryology
86-001440
Endocrinology
86-001428
Lamprey Control
86-001965
Piscicides
86-001965
TFM
86-001965
Twinning
86-001440
Variation Studies
86-001534
Phoxinus eos
Early Development
86-001361
Phoxinus phoxinus
Alarm Substances
86-001491
Steroids
86-001491
Pimelometopon maculatus
Hatschekia affluens
86-001847
Hatschekia amphiprocessa
86-001847
Parasites/Diseases
86-001847
Parasitic Copepods
86-001847
Pimephales promelas
Alarm Reaction
86-001573
Alpha-Terthienyl
86-001932
Culture/Propagation
86-001336
Dioxin
86-001911
Fluridone
86-001902
Phosphate Esters
86-001884
Piscicides
86-001336
86-001932
Selenium
86-001455
86-001456
TFM
86-001336
Platichthys flesus
Hexachlorobenzene
86-001907
Musculature
86-001451
Temperature
86-001451
Plecoglossus altivelis
Bacterial Diseases
86-001805
86-001806
Ichthyophonus hoferi
86-001806
Parasites/Diseases
86-001805
86-001806

Pleuronectes platessa
Cadmium
86-001899
Foods/Feeding
86-001659
Heavy Metals
86-001899
Leucocyte Migration
86-001467
Population Studies
86-001604
Production
86-001604
Pleuronichthys cornutus
Age/Growth
86-001700
Pneumatophorus japonicus
Schooling Behavior
86-001558
Poecilia
Hybridization
86-001652
Spawning
86-001652
Unisex Populations
86-001652
Poecilia latipinna
Foods/Feeding
86-001664
Trophic Relationships
86-001664
Poecilia reticulata
Bacterial Diseases
86-001413
Bacterial Flora
86-001413
Culture/Propagation
86-001293
Parasites/Diseases
86-001413
Pheromones
86-001560
Spawning
86-001641
Temperature
86-001560
Poeciliidae
Scales
86-001369
Poeciliopsis lucida
Hybridization
86-001638
Spawning Behavior
86-001638
Unisex Populations
86-001536
86-001638
Poeciliopsis monacha
Hybridization
86-001638
Spawning Behavior
86-001638
Unisex Populations
86-001536
86-001638
Pollachius virens
Helminths
86-001851
Parasites/Diseases
86-001851
Polypterus ornatipinnis
Aquariums
86-001324
Culture/Propagation
86-001324
Pomacentridae
Symbiosis
86-001554
Pomacentrus partitus
Parasites/Diseases
86-001849
Tumors
86-001849
Pomatomus saltatrix
Harvest
86-001960
Movements
86-001960
Pomatoschistus microps
Foods/Feeding
86-001677
Popondetta funcata
Distribution/Geographical
86-001713
Premnas
Symbiosis
86-001554
Pristobrycon striolatus
Foods/Feeding
86-001675
Mouth Parts
86-001675
Pseudopleuronectes americanus
Heavy Metals
86-001869
Zinc
86-001869
Pseudopleuronectes platessa
Parasites/Diseases
86-001850
Trematodes
86-001850
Pterolebias wischmanni
Aquariums
86-001328
Culture/Propagation
86-001328
Puntius binotatus
Parasites/Diseases
86-001796
Puntius conchonius
Cadmium
86-001900
Heavy Metals
86-001900
Pygocentrus notatus
Foods/Feeding
86-001675
Mouth Parts
86-001675
Raja eglanteria
Embryology
86-001353
Rajidae
Distribution/Geographical
86-001731
Rasbora heteromorpha
Aquariums
86-001326
Culture/Propagation
86-001326
Rhamdia sapo
Culture/Propagation
86-001299
Pond Culture
86-001299
Rhinichthys cataractae
Meristic Studies
86-001552
Variation Studies
86-001552

Rhinoraja taranetzi
New Species
86-001768
Rhodeus ocellatus
Schooling Behavior
86-001558
Rhodeus ocellatus ocellatus
Schooling Behavior
86-001564
Rutilus rutilus
Meristic Studies
86-001863
Pulp Mill Effluents
86-001914
Stress
86-001518
Temperature
86-001518
Thermal Pollution
86-001863
Salmo
Chlorothalonil
86-001892
Salmo clarki
Competition
86-001556
Salinity
86-001364
Salmo gairdneri
Acoustico-Lateralis System
86-001481
Age/Growth
86-001709
Alkanes
86-001889
Aluminum
86-001912
86-001915
Aroclor
86-001883
Bacterial Diseases
86-001799
Biomagnification
86-001920
Blood Chemistry
86-001298
86-001399
86-001434
86-001509
Cadmium
86-001890
86-001918
Calcium
86-001399
Catecholamines
86-001482
Chlorinated Dibenzo-p-Dioxins
86-001913
Chlorinated Dibenzofurans
86-001913
Chlorine
86-001866
Chlorothalonil
86-001893
86-001894
Coloration
86-001388
Competition
86-001571
Copper
86-001918
Culture/Propagation
86-001285
86-001298
86-001319

...CONTINUED...
Salmo gairdneri
Dieldrin
86-001920
Diets
86-001319
Digestive System
86-001379
Dioxin
86-001911
Endocrinology
86-001298
Enteric Redmouth Disease
86-001799
Exercise
86-001417
86-001497
Fish Hatchery Effluents
86-001285
Fish Kills
86-001859
Gene Polymorphism
86-001543
Gene Transfer
86-001528
Habitat Selection
86-001561
Heavy Metals
86-001859
86-001878
86-001890
86-001893
86-001912
86-001915
86-001918
86-001919
Hydrocarbons
86-001888
Hypoxia
86-001509
Immunization
86-001799
Insecticides
86-001920
Lead
86-001890
Lipid Metabolism
86-001513
86-001888
Liver
86-001500
Metabolic Rates
86-001517
Musculature
86-001562
Naphthenic Hydrocarbons
86-001888
Nutrition
86-001319
Organochlorines
86-001920
Osmoregulation
86-001416
86-001426
86-001434
86-001443
86-001450
86-001514
86-001523
Otoliths
86-002019
Parasites/Diseases
86-001799
Parr-Smolt Transformation
86-001523
pH
86-001912

...CONTINUED...
Salmo gairdneri
Phosphate Esters
86-001884
Pigments
86-001388
Population Studies
86-001608
Potassium
86-001426
Prostaglandins
86-001407
Protein Synthesis
86-001465
86-001866
Quinoline
86-001876
rDNA
86-001543
Rearing Density
86-001298
Renin-Angrotensis
86-001485
Salinity
86-001379
86-001443
86-001450
Spawning
86-001636
Specific Dynamic Action
86-001319
Stress
86-001399
86-001489
Swimming Performance
86-001417
86-001562
Temperature
86-001465
86-001513
Xenobiotics
86-001876
Yersinia ruckeri
86-001799
Zinc
86-001859
86-001878
86-001893
86-001918
Salmo salar
Acid Precipitation
86-001459
Age/Length Composition
86-001593
Bird Predation
86-001746
Blood Chemistry
86-001459
Culture/Propagation
86-001322
Diets
86-001322
DNA
86-001527
Endocrinology
86-001460
Enzymes
86-001495
Fecundity
86-001593
Feeding Experiments
86-001322
Flow Regimes
86-001949
Hepatic Cysts
86-001827

...CONTINUED...
Salmo salar
Jellyfish Toxin
86-001879
Landlocked Populations
86-001606
Osmoregulation
86-001466
86-001494
Pancreas Disease
86-001835
Parasites/Diseases
86-001827
86-001835
Parr-Smolt Transformation
86-001460
86-001466
pH
86-001459
Population Studies
86-001621
Reservoir Release Effects
86-001949
Sex Ratios
86-001593
Swimming Performance
86-001466
Tumors
86-001827
Salmo trutta
Age/Growth
86-001673
Aluminum
86-001909
86-001910
Blood Chemistry
86-001492
Competition
86-001673
Cortisol
86-001492
Fecundity
86-001629
Flow Regimes
86-001949
Foods/Feeding
86-001673
86-001692
Heavy Metals
86-001909
86-001910
Maturation
86-001629
pH
86-001909
86-001910
86-001923
Reservoir Release Effects
86-001949
Temperature
86-001923
Salmonidae
Catch and Release
86-001964
Culture/Propagation
86-001284
86-001286
86-001335
Dams
86-001947
86-001950
Eggs
86-001363
Management/Research--General
86-001963
86-001964

...CONTINUED...
Salmonidae
Metabolic Rates
86-001414
Myxosoma cerebralis
86-001818
Parasites/Diseases
86-001818
Power Plants
86-001950
Protozoan Diseases
86-001818
Recirculating Systems
86-001335
Regulations
86-001963
86-001964
Whirling Disease
86-001818
Salvelinus alpinus
Chemoreception
86-001563
Dwarfism
86-001683
Foods/Feeding
86-001683
Olfaction
86-001553
Orientation/Homing
86-001553
Pheromones
86-001553
Variation Studies
86-001533
Salvelinus fontinalis
Ammonium
86-001880
Competition
86-001571
Gene Polymorphism
86-001543
Light
86-001568
Photoperiodism
86-001568
rDNA
86-001543
Reproductive System
86-001464
Spawning
86-001635
Salvelinus malma miyabei
Spawning
86-001642
Salvelinus namaycush
Abundance/Factors of
86-001753
Ammonia
86-001287
Culture/Propagation
86-001287
Egg Survival
86-001753
Gene Polymorphism
86-001543
Light
86-001568
Mortality Rates
86-001753
Photoperiodism
86-001568
rDNA
86-001543
Recirculating Systems
86-001287
Sarda chiliensis
Foods/Feeding
86-001660
Sardina pilchardus
Lernaeenicus sprattae
86-001832
Parasites/Diseases
86-001832
Parasitic Copepods
86-001832
Sardinops melanosticta
Distribution/Vertical
86-001654
Schooling Behavior
86-001557
Sardinops sagax sagax
Age/Growth
86-001695
Sarotherodon
DNA
86-001537
Karyotypes
86-001537
Sarotherodon melanotheron
Temperature
86-001574
Temperature Selection
86-001574
Sarotherodon mossambicus
Salinity
86-001411
Temperature
86-001411
Schizothorax dulongensis
New Species
86-001784
Schizothorax elongatus
New Species
86-001784
Schizothorax oligolepis
New Species
86-001784
Schizothorax oligolepis malacathus
New Subspecies
86-001784
Sciaenops ocellatus
Condition Factors
86-001625
Oil
86-001901
Population Studies
86-001625
Scomber japonicus
Enzymes
86-001499
Musculature
86-001499
Population Studies
86-001616
Production
86-001616
Swimming Performance
86-001572
Temperature
86-001572
Scombridae
Jurisdiction
86-002012
Management/Research--Marine
86-002012
Scyliorhinus canicula
Ampullary System
86-001490
Heavy Metals
86-001925
Stress
86-001925
Zinc
86-001925

Scyliorhinus meadi
Life History/General
86-001592
Sebastes
Foods/Feeding
86-001687
Sexual Dimorphism
86-001360
Taxonomy
86-001781
Sebastes fasciatus
Early Development
86-001382
Identification/Larvae
86-001382
Sebastes flavidus
Carotenoids
86-001449
Sebastes mentella
Early Development
86-001382
Identification/Larvae
86-001382
Semotilus atromaculatus
DNA
86-001401
Seriola lalandi
Identification/Larvae
86-001393
Morphology
86-001393
Seriola quinqueradiata
Culture/Propagation
86-001321
Diets
86-001321
Feeding Experiments
86-001321
Nutrition
86-001321
Serranus fasciatus
Hermaphroditism
86-001441
Reproduction
86-001441
Serrasalmus niger
Calyptospora serrasalmi
86-001829
Parasites/Diseases
86-001829
Protozoan Diseases
86-001829
Serrasalmus rhombeus
Foods/Feeding
86-001675
Mouth Parts
86-001675
Shizothorax davidi fumengensis
New Subspecies
86-001784
Sicydium plumieri
Life History/General
86-001584
Movements
86-001584
Spawning
86-001584
Sillago analis
Harvest
86-002011
Management/Research--Marine
86-002011
Mortality Rates
86-002011
Sillago ciliata
Harvest
86-002011

...CONTINUED...
Sillago ciliata
Management/Research--Marine
86-002011
Mortality Rates
86-002011
Sillago sihama
Light
86-001640
Spawning
86-001640
Temperature
86-001640
Silurus glanis
Bacterial Diseases
86-001801
Parasites/Diseases
86-001801
Vibrio
86-001801
Sinocyclocheilus lunanensis
New Species
86-001788
Sinocyclocheilus macrocephalus
New Species
86-001788
Sinocyclocheilus oxycephalus
New Species
86-001788
Sinocyclocheilus purpureus
New Species
86-001788
Solea vulgaris
Fecundity
86-001639
Reproduction
86-001639
Sparidae
Dentition
86-001365
Sparus aurata
Cryptocaryon irritans
86-001812
Parasites/Diseases
86-001812
Protozoan Diseases
86-001812
Sphoeroides pachygaster
Distribution/Geographical
86-001724
Squalus acanthias
Rectal Gland
86-001503
Stress
86-001430
Stegastes fasciolatus
Territorial Behavior
86-001559
Stizostedion vitreum vitreum
Abundance/Factors of
86-001617
Age/Growth
86-001701
Culture/Propagation
86-001617
Egg Collection
86-001617
Fecundity
86-001701
Population Studies
86-001617
Tetradontidae
Aquariums
86-001330
Culture/Propagation
86-001330

Thunnus alalunga
Foods/Feeding
86-001660
Thunnus albacares
Selenium
86-001406
Thunnus thynnus
Musculature
86-001436
Thermal Regulation
86-001436
Tilapia
Aspergillus
86-001816
Bacterial Diseases
86-001798
DNA
86-001537
Flexibacter columnaris
86-001798
Fluorescent Antibody Technique
86-001816
Fungal Diseases
86-001816
Karyotypes
86-001537
Parasites/Diseases
86-001798
86-001816
Tilapia zillii
Appetite Stimulants
86-001296
Culture/Propagation
86-001296
Tor canis
Foods/Feeding
86-001688
Triakis semifasciata
Cestodes
86-001848
Lacistorhynchus tenuis
86-001848
Parasites/Diseases
86-001848
Tribolodon hakonensis
Schooling Behavior
86-001558
Umbra limi
Abundance/Factors of
86-001761
Management/Research--Lakes
86-001761
Population Studies
86-001761
Urolophus halleri
Eimeria halleri
86-001817
Parasites/Diseases
86-001817
Protozoan Diseases
86-001817
Venefica proboscidea
Distribution/Vertical
86-001590
Fish Lists/Keys
86-001590
Identification
86-001590
Life History/General
86-001590
Xenomelaniris venezuelae
Population Studies
86-001624
Xiphophorus
Aquariums
86-001329

...CONTINUED...
Xiphophorus
Culture/Propagation
86-001329
Xiphophorus helleri
Precocious Maturation
86-001468
Reproduction
86-001468
Zoarces viviparus
Cadmium
86-001908
Heavy Metals
86-001908
Lactate Dehydrogenase
86-001545
Population Genetics
86-001545
Variation Studies
86-001545

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